

BIOGRAPHICAL SKETCH

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NAME: Zhong, Guangming

eRA COMMONS USER NAME (credential, e.g., agency login): Zhong1

POSITION TITLE: Professor of Microbiology and Immunology

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Xiangya School of Medicine, Central South University (CSU), Changsha, China	M.D. (equivalent)	08/1983	Preventive Medicine
Xiangya School of Medicine, CSU, Changsha, China	M.Sc.	08/1986	Microbiology & Immunology
University of California, Irvine, CA	Visiting fellow	12/1987	Pathology (Mentor: Dr. Luis De La Maza)
University of Manitoba, Winnipeg, Canada	Ph.D.	05/1991	Medical Microbiology (Mentor: Dr. Robert Brunham)
University of Missouri, Columbia, MO	Post Doctoral fellow	03/1993	Molecular Biology (Mentor: Dr. George Smith)
National Institutes of Health, Bethesda, MD	Post Doctoral fellow	03/1996	Immunology (Mentor: Ronald Germain)

A. Personal Statement

Our recent findings that *Chlamydia*, conventionally described as a genital tract pathogen, may be a normal commensal in the gastrointestinal (GI) tract, have led us to focus our research programs on the mechanisms of **gut microbiota/chlamydia interactions with the host**. We are interested in understanding how gut microbiota/chlamydia may impact host physiology and pathology. Since chlamydial colonization in the GI is not only nonpathogenic but also protective against colitis induced by DSS and dysbiosis induced by antibiotics, we are developing chlamydial organisms as a platform for orally delivering host beneficial factors. The chlamydia-mediated delivery is expected to be more efficient than the traditional probiotic species-based delivery, the latter of which often uses extracellular bacteria such as lactobacillus. The distinction is that chlamydia is an obligate intracellular bacterium that can stably colonize the gut mucosal tissues by hiding inside enterocytes while the extracellular lactobacillus can only stay the lumen and is easily discharged from the GI tract. That's why the currently practiced probiotics regimes invariably require constant supply of probiotic bacteria-containing materials in order to allow the host to get marginal beneficial effects from the probiotic species. However, a single inoculation of the chlamydial organisms into the GI tract is sufficient for chlamydia to stay in the GI tract for long periods of time. Thus, we are, on one hand, engineering chlamydial organisms for the purpose of GI tract delivery of non-chlamydial factors and on the other, evaluating the effects of gut microbiota and chlamydial colonization in the GI tract on various pathologies spontaneously developed due to genetic predisposition and/or chemically induced. The disease models include **colitis, colorectal cancer, obesity/diabetes, atherosclerosis, Parkinson's disease** and **Alzheimer's disease**. Our expertise and knowledge on bacteria and host immune responses accumulated in the past 30 years should enable us to harness the power of gut microbiota/chlamydia for both regulating physiology and attenuating pathology via epigenetic mechanisms.

B. Positions and employment

1990-1991 Research Associate, Medical Microbiology, University of Manitoba
1996-1999 Assistant Professor, Medical Microbiology, University of Manitoba
2000-2002 Assistant Professor, Microbiology, University of Texas Health Sci Ctr @ San Antonio
2002-2005 Associate Professor, Microbiology & Immunology, Univ. Texas Health Sci Ctr @ SA
2005-pres. Professor, Microbiology & Immunology, Univ. of Texas Health Sci Ctr @ SA
2007-2011 Co-director for Microbiology and Immunology Ph.D. Track at UTHSCSA
2010-pres. Scientific co-director for San Antonio Vaccine Center
2013-pres. Director of the Xiangya Medical Student Exchange Program

Honors

1989-1990 University of Manitoba Graduate Studentship (declined)
1990-1991 Manitoba Health Research Council Fellowship
1993-1994 Medical Research Council of Canada Fellowship
1994-1996 International Forgarty Fellowship (NIH)
1997-2002 Medical Research Council of Canada Scholarship as salary (till leaving Canada)
1996 Rh Award for outstanding contribution to biomedical research

Other professional activities

2000-pres., Review manuscripts for >30 scientific journals, including JEM, Immunity & Science
2001-pres., Ad hoc reviewer for various NIH study sections
2003-2007, UTHSCSA Graduate School Dean's Award Review Committee member
2004-2007, UTHSCSA ERC grant proposal scientific review committee member
2007-2011, NIH Host Interactions with Bacterial Pathogen (HIBP) study section regular member
2008-2011, Associate editor, Canadian Journal of Physiology and Pharmacology
2009-pres., Editorial Board member, Infection and Immunity
2015-pres., Academic editor, PLOS One

C. Contribution to Science

In the past 30 years, we have made significant contributions to the fields of microbial pathogenesis and vaccine developments, most of which are summarized in the >180 peer-reviewed articles. Please access to the complete list of our published work in MyBibliography at:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/guangming.zhong.1/bibliography/41139211/public/?sort=date&direction=descending>

D. Research support

Ongoing

R01 AI121989 (Zhong) 07/01/16-06/30/20
NIH/NIAID
Chlamydial plasmid-dependent pathogenicity
The major goals of this project were to map the chlamydial plasmid genes required for chlamydial induction of hydrosalpinx and further determine mechanisms by the chlamydial plasmid promotes ascension and tubal inflammation in the genital tract.

R21 AI105712 (Zhong) 04/01/16 - 03/30/18
NIH/NIAID
Chlamydia Vaccine---Global Search for Chlamydial T Cell Antigens in HLA-DR4 Transgenic Mice
This R21 is to map antigens recognized by T cells from DR4 mice with protective immunity.

R01 AI47997-14 (Zhong) 07/01/00-12/31/17
NIH/NIAID
Chlamydial Evasion of Immune Recognition
The major goals of this project are to characterize Chlamydia-secreted proteases in terms of their secretion pathways and functions during chlamydial infection.

This pilot project is to analyze mouse gut microbiota and correlate the microbiota profiles with chlamydial pathogenicity in the upper genital tract

Overlap: None

Completed

R01 AI064537-10 (Zhong)

07/01/05-12/31/16

NIH/NIAID

Chlamydia trachomatis proteomics

The major goals of this project in the last funding period were to identify and characterize the pathogenic and protective chlamydial determinants. We also carried out an in-depth characterization of one of the identified chlamydial pathogenic virulence factors, the plasmid-encoded Pgp3. A competitive renewal was submitted for the funding period of 01/01/2017-12/31/22.

DOD W911NF-11-1-0136 (Bernard)

5/01/11-4/30/16

Center of Excellence in Infection Genomics

Subcontract 26-0430-25: Proteomics core (Zhong)

T32 AI007271 (Zhong)

9/2009 - 8/2014

NIH/NIAID

Molecular Mechanisms of Microbial Pathogenesis

This is a training grant for supporting 3 domestic PhD candidates

R01 AI057450 (Zhong)

8/2007 - 7/2012

NIH/NIAID

Chlamydial Manipulation of Host Apoptosis

The major goal was to evaluate the chlamydial interactions with host cell apoptosis pathways and understand the mechanisms of the chlamydial antiapoptotic activity

Merck (Zhong)

12/2008-12/2013

Chlamydia trachomatis vaccine

The major goal was to evaluate the chlamydial immunodominant proteins for inducing protection against chlamydial challenging infection

U19 AI045429 (PI: Baseman)

9/2004 – 8/2009

Novel Chlamydia Vaccine Candidates

The major goal was to discover new chlamydial antigens that can induce protective immunity

R01 HL064883 (Zhong)

8/2000 - 7/2005

NIH/HL

C. pneumoniae Exacerbation of Atherosclerosis

The major goal was to evaluate the effect of Chlamydia pneumoniae infection on atherosclerotic plaque development in LDLR-/- mice fed high cholesterol diet.

Research projects available to Xiangya medical students in the Zhong lab

Gut microbiota/chlamydia in colitis/colorectal cancer, fallopian tube fibrosis/tubal infertility, atherosclerosis, obesity/diabetes, Parkinson's disease or Alzheimer's disease

Our recent findings that *Chlamydia*, conventionally described as a genital tract pathogen, may be a normal commensal in the gastrointestinal (GI) tract, have led us to focus our research programs on the mechanisms of **gut microbiota/chlamydia interactions with the host**.

We are investigating how gut microbiota/chlamydia may impact host physiology and pathology. Since chlamydial colonization in the GI is not only nonpathogenic but also protective against colitis induced by DSS and dysbiosis induced by antibiotics, we are developing chlamydial organisms as a platform for orally delivering host beneficial factors. The chlamydia-mediated delivery is expected to be more efficient than the traditional probiotic species-based delivery, the latter of which often uses extracellular bacteria such as lactobacillus. The distinction is that chlamydia is an obligate intracellular bacterium that can stably colonize the gut mucosal tissues by hiding inside enterocytes while the extracellular lactobacillus can only stay the lumen and is easily discharged from the GI tract. That's why the currently practiced probiotics regimes invariably require constant supply of probiotic bacteria-containing materials in order to allow the host to get marginal beneficial effects from the probiotic species. However, a single inoculation of the chlamydial organisms into the GI tract is sufficient for chlamydia to stay in the GI tract for long periods of time. Thus, we are, on one hand, engineering chlamydial organisms for the purpose of GI tract delivery of non-chlamydial factors and on the other, evaluating the effects of gut microbiota and chlamydial colonization in the GI tract on various pathologies spontaneously developed due to genetic predisposition and/or chemically induced.

The specific projects available for Xiangya students include:

1. **Gut microbiota and colitis/colorectal cancer**
2. **Gut Chlamydia and fallopian tube fibrosis/tubal infertility**
3. **Gut microbiota and atherosclerosis**
4. **Gut microbiota and obesity/diabetes**
5. **Gut microbiota and Parkinson's disease**
6. **Gut microbiota and Alzheimer's disease**

Our expertise and knowledge on bacteria and host immune responses accumulated in the past 30 years should enable us to harness the power of gut microbiota/chlamydia for both regulating physiology and attenuating pathology via epigenetic mechanisms.